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10/064,541	07/25/2002	Jerome Stephen Arenson	122938	1272
23413	7590	03/12/2004	EXAMINER	
CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002			HO, ALLEN C	
			ART UNIT	PAPER NUMBER
			2882	

DATE MAILED: 03/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/064,541

Applicant(s)

ARENSEN ET AL.

Examiner

Allen C. Ho

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 23 February 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,2,5-13,17,18,21-29 and 32-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-13,17,18,21-29 and 32-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 0503, 1003.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Objections*

1. Claims 33-36 are objected to because of the following informalities: "determines" should be replaced by --determine-- after "adapted to:". Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, and 5-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Gono *et al.* (U. S. Patent No. 5,873,826).

With regard to claim 1, Gono *et al.* disclosed a method for reducing radiation exposure from an imaging system adapted to provide a radiation distribution about an object cavity during a scan, the method comprising the steps of: determining an entry location (between  $\phi_1$  and  $\phi_2$ ) representative of a location of a hand (h); operating the imaging system so as to cause the imaging system to emit radiation (1b) having a radiation intensity and an angular radiation distribution (Figs. 9 and 10); controlling (4) the radiation intensity in a manner responsive to the entry location so as to create image data (see steps shown in Fig. 4); and processing the image data to create processed image data (column 4, lines 15-17).

With regard to claim 2, Gono *et al.* disclosed the method of claim 1, wherein the determining step includes determining the entry location (in terms of gantry angular range of the x-ray source) relative the imaging system.

With regard to claim 5, Gono *et al.* disclosed the method of claim 1, wherein the entry location is determined in a manner responsive to a FluoroCT scan (column 1, lines 38-42).

With regard to claim 6, Gono *et al.* disclosed the method of claim 1, wherein the imaging system includes an object cavity (inherent for a CT) and a radiation source (1b) having a gantry angular position ( $\phi$ ), wherein the radiation source is rotatably associated with the imaging system so as to rotate around the object cavity, and wherein the entry location includes an entry angular range (between  $\phi_1$  and  $\phi_2$ ).

With regard to claim 7, Gono *et al.* disclosed the method of claim 6, wherein the operating step includes operating the imaging system so as to cause the radiation source to rotate around the object cavity (inherent for a CT).

With regard to claims 8 and 9, Gono *et al.* disclosed the method of claim 6, wherein the controlling step includes controlling the radiation intensity such that the radiation intensity is decreased by a predetermined minimization amount when the gantry angular position is within the entry angular range (Fig. 9), wherein the predetermined minimization amount is equal to the radiation intensity (corresponding to a tube current of 200 mA).

With regard to claim 10, Gono *et al.* disclosed the method of claim 6, wherein the controlling step includes controlling the radiation intensity such that the radiation intensity is increased by a predetermined minimization amount (corresponding to a tube current of 200 mA) when the gantry angular position is within 180 degrees of the entry angular range (Fig. 9).

With regard to claim 11, Gono *et al.* disclosed the method of claim 6, wherein the controlling step includes controlling the radiation intensity such that the radiation intensity is increased by a predetermined minimization amount (corresponding to a tube current of 200 mA) when the gantry angular position is within 90 degrees of the entry angular range (Fig. 9).

With regard to claim 12, Gono *et al.* disclosed the method of claim 6, wherein the operating step includes operating the imaging system so as to determine a radiation absorption angular profile (x-ray absorption/attenuation data for 3D reconstruction), wherein the radiation absorption angular profile is responsive to the gantry angular position (This is inherent, since this is what a CT is designed to do).

With regard to claim 32, Gono *et al.* disclosed a method for reducing a physician's radiation exposure from an imaging system while maintaining patient dose and image quality comprising: obtaining an object to be scanned; operating the imaging system so as to create image data; displaying (20) the image data on an output device; and processing the image data using a processing device (20). No patentable weight has been given to the structure of the processing device.

With regard to claims 33 and 35, Gono *et al.* disclosed a system for reducing the physician's radiation exposure from an imaging system while maintaining patient dose and image quality comprising: a gantry (10) having an x-ray source (1b) and a radiation detector array (2a), wherein the gantry defines a patient cavity, and wherein the x-ray source and the radiation detector array are rotatably associated with the gantry so as to be separated by the patient cavity; a patient support structure (necessary for supporting the patient) movably associated with the gantry so as to allow communication with the patient cavity; and a processing device (20).

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With regard to claims 34 and 36, Gono *et al.* disclosed the system of claims 33 and 35, wherein the imaging system is a computed tomography imaging system.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 17, 18, 21-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gono *et al.* (U. S. Patent No. 5,873,826) in view of Zmora (U. S. Patent No. 6,028,909).

With regard to claims 17, 18, 21-28, Gono *et al.* disclosed the method of claims of 1, 2, and 5-12. However, Gono *et al.* failed to teach a medium encoded with a machine-readable computer program codes that implement the method of claims 1, 2, and 5-12.

Zmora disclosed a method for CT imaging in the form of a computer readable medium. Zmora taught that a method for a computer-based system could be carried out using software, which could be upgraded as needed (column 8, lines 24-29).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide the method in the form of a computer program stored on a computer-readable medium, since a person would be motivated to modify and/or improve on the method as needed.

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6. Claims 13 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gono *et al.* (U. S. Patent No. 5,873,826) in view of Zmora (U. S. Patent No. 6,028,909) as applied to claims 12 and 28 above, and further in view of Popescu (U. S. Patent No. 5,822,393).

With regard to claims 13 and 29, Gono *et al.* in combination with Zmora disclosed the method and the medium of claims 12 and 28. However, Gono *et al.* in combination with Zmora failed to teach controlling the imaging system so as to modulate the radiation intensity in a manner responsive to the radiation absorption angular profile.

Popescu disclosed a CT system and method that modulates the radiation intensity in a manner responsive to the radiation absorption angular profile (column 6, lines 6-17). Popescu taught the method keeps the minimum x-ray intensity above the noise level, so that a noise-free image can be reconstructed (column 5, lines 38-53).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modulate the radiation intensity in a manner responsive to the radiation absorption angular profile, since a person would be motivated to obtain a noise-free image for diagnosis.

### ***Response to Arguments***

7. Applicant's arguments filed 23 February 2003 have been fully considered but they are not persuasive.

First of all, language such as "adapted to" suggests or makes optional but does not require steps to be performed or does not limit a claim to a particular structure does not limit the scope of a claim or claim limitation. MPEP § 2106. Second, with regard to claims 1, 2, 5-13, 17, 18,

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21-29, and 32, this amendment fails to set forth additional method steps to be performed in a method claim.

Furthermore, the examiner disagrees with applicants' assertion that Gono *et al.* failed to teach the first and second average radiation distributions are about constant throughout the scan. As pointed out by the applicants, Gono *et al.* disclosed an x-ray CT apparatus capable of providing a first and a second angular radiation distributions suitable for both 180 degree reconstruction and 360 degree reconstruction. Each of these distributions has an average distribution since one could always calculate an average of any distribution. Since an average is just a constant, the first and second average radiation distributions could be said to be constant throughout the scan.

Accordingly, the rejection is being maintained.

8. Applicant's arguments, p. 11-12, with respect to drawings have been fully considered and are persuasive. The objections to the drawings have been withdrawn.

9. Applicant's arguments, p. 12-13, with respect to the specification have been fully considered and are persuasive. The objection to the specification has been withdrawn.

10. Applicant's arguments, p. 13, with respect to claim 32 have been fully considered and are persuasive. The objection of claim 32 has been withdrawn.

11. Applicant's arguments, p. 13-17, with respect to claims 1-15, 17-30, 32-36 have been fully considered and are persuasive. The rejections of claims 1-15, 17-30, 32-36 under U.S.C. § 112 have been withdrawn.



***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:


- (1) Guendel (U. S. Patent No. 6,501,820 B2) disclosed an x-ray CT apparatus and method for reducing the radiation dose to an examiner.
- (2) Iwano *et al.* (U. S. Patent No. 6,487,431 B1) disclosed a radiographic apparatus and method for monitoring the path of a thrust needle.
- (3) Bittle *et al.* (U. S. Patent No. 6,385,280 B1) disclosed an x-ray CT with modulation of the x-ray source.
- (4) Popescu *et al.* (U. S. Patent No. 5,867,555) disclosed adaptive dose modulation during CT scanning.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (571) 272-2491. The examiner can normally be reached on Monday - Friday from 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached at (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Allen C. Ho  
Patent Examiner  
Art Unit 2882

ACH